

## PATENT SPECIFICATION

628.801



Convention Date (Sweden): June 5, 1946.

Application Date (In United Kingdom): June 4, 1947.

No. 14776/47.

Complete Specification Accepted: Aug. 25, 1949.

Index at acceptance:—Class 61(iii), H4(b:m1:m6).

20. Okt. 1949

## COMPLETE SPECIFICATION

## Improvements in or relating to Adjustable Wrenches

1. JOHAN PERSSON, a Swedish Subject, of Fleminggatan 16, Stockholm, Sweden, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

The present invention relates to adjustable wrenches with a handle carrying a head with a stationary jaw and an adjustable jaw, the distance between the jaws being adjustable by a worm or screw journaled in the head and slidable by means of the handle lever which is pivoted to the head and spring-actuated.

The main object of the invention is the provision of means whereby the wrench in a simple and efficient manner only by reverse movement of the handle or by such movement in combination with a simple opening of the grip by hand will obtain a new grip on the work (nut or screw head) without the necessity of removing the wrench from the work. Another object is to provide a wrench of said kind in such a manner that the grip of the wrench on the work will be firm and secure. A further object is the provision of means which will prevent unintentional movement or play of the adjusting worm or screw.

In a wrench according to the invention the worm is journaled on a shaft slidable in the head and, by a cog or tooth connection, standing in permanent articulated connection with the handle lever for imparting sliding movement of the shaft and worm in either adjusting direction of the adjustable jaw by actuation of the handle lever. The pivot of the handle lever is placed so near the engaging point between the tooth on the handle lever and the tooth-engaging recess in the worm shaft, that the arm of the lever forming the handle proper has a length sufficient to cause the jaws to maintain a firm grip on the nut or screw head when the handle lever is swung in the one direction.

[Price 2/-]

The adjusting worm or screw is controlled by a permanent braking pressure preventing unintentional play of said worm or screw.

These and other features of the invention will be made clear by the following description with reference to the accompanying drawing illustrating an embodiment of the invention. In the drawing, Figures 1 and 2 are side elevations of the wrench, a cover plate being removed from the head of the wrench in Figure 1. Figure 3 is an edge view of the head portion of the wrench. Figure 4 is a section on the line IV—IV of Figure 2, and Figure 5 shows a fragmentary section on the line V—V of Figure 2.

The wrench comprises a head 1 and a handle 2, and this handle is pivoted to the head by a pin 3. A cover plate 4 attached by rivets belongs to the head 1. One of these rivets also serves as pivot 3 for the handle 2, another rivet serves as clamping pin 6 for a leaf spring 7, and still another rivet serves as supporting pin 5 for the handle 2. As usual, the wrench head 1 is provided with a stationary jaw 8 and a movable jaw 9 which latter is adjustable towards and from the stationary jaw 8 by a screw or worm 10 which is rotarily journaled in the head 1 on a carrying shaft or spindle 12 which is movable longitudinally in suitable guideways 11 in the head 1 (Figure 1) in the direction of movement of the adjustable jaw 9, but which is not rotatable relative to the head. One end portion of the shaft 12 (the left portion according to Figure 1) preferably has a rectangular or other non-circular cross section and engages directly with the correspondingly shaped guideways 11 of the head 1, and this end portion is provided with a recess 13 with which a cog, tooth or projection 14 on the end of the handle 2 permanently engages in similar manner as a tooth of a toothed wheel. This permanent articulated connection may, of

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course, also consist of several teeth or a toothed segment engaging with corresponding recesses or a rack formed on the shaft 12. The portion of the shaft 12 at the opposite end of the worm 10 engages indirectly with the guideways 11 of the head 1 by means of a sleeve or socket 15 of substantially rectangular or other non-circular cross-section on said portion of the shaft. This sleeve or socket is slidable together with the carrying shaft 12 but not rotary in the guideways. The extreme or right end of the socket 15 is recessed to receive a coil spring 16 which by means of a nut 17 on the adjacent threaded end of the shaft 12 is forced against the socket 15 which, in turn, is forced against the worm 10. Thus, the socket 15 will exert a permanent braking pressure on the worm 10 so that in use of the wrench unintentional rotation of the worm and loosening of the grip of the wrench on the work is prevented. Between the head 1 and handle 2 the leaf spring 7 (Figure 1) is provided tending to hold the handle 2 in contact with the stop pin 5 or other stop member in the head 1 for obtaining a suitable position of the head 1 in relation to the handle 2 in the adjustment of the distance between the jaws, for grip on the nut or screw and in reverse movement when a new grip on the nut or screw is to be taken. One end portion of the leaf spring 7 is forced against the handle 2 and the other end portion of the spring is clamped between the pin 6 and a pin 18 in the head 1. This latter pin 18, engaging with the extreme end of the spring, is provided with screw threads engaging with corresponding threads in a hole in the cover plate 4 as shown particularly by Figure 5. Thus, the pin 18 may be easily removed if the leaf spring 7 must be replaced by a new one. The end portion of the handle 2 adjacent to the shaft 12 (Figure 1) is provided with a stop surface 19 adapted to contact with the shaft 12 in a certain position of the handle. The position of the stop surface 19 in relation to the shaft 12 determines the size of the greatest reverse movement of the handle 2. The head 1 including the cover plate 4 is extended rearwardly in the longitudinal direction of the handle 2 and this rear extension, which may be of various lengths, terminates in a tongue 20 for opening the grip by hand if such is desired. The tongue 20 extends somewhat laterally of the handle 2 for movement of the head 1 by the operator's hand or finger, if such manual operation of the head is desired. The head 1 with the cover plate 4 is provided with bevelled surfaces 21 (Figures 2 and 4) about the worm 10 which assures a good grip for the operator

when the opening between the jaws is to be adjusted by rotation of the worm.

The pivot pin 3 of the handle 2 in different sizes of the wrench is so located that the handle 2 forms a lever of a certain length. Obviously the two jaws of the wrench in the operation thereof for tightening of a nut or screw are actuated by forces that are directed opposite to each other. The pivot pin 3 is to be placed so near the engaging point between the recess 13 and projection 14 that the resultant of said forces will tend to force the movable jaw 9 towards the stationary jaw 8.

The supporting or stop pin 5 in the head 1 is so located in relation to the pivot pin 3 of the handle 2 that these two pins in co-operation will prevent the handle 2 from jamming the worm 10 in the head 1 whereby the adjustments will be easily effected. Said pins also hold the handle 2 in such a normal or resting position in relation to the head 1 that the wrench will be strong and durable also if the same would be used as a hammer since in such use the stresses will be taken up by the two pins.

As is evident by the description, after a turning of the nut or screw by the wrench the opening between the jaws can be increased in a simple and efficient manner by reverse movement of the handle 2 which by the shaft 12 and the adjusting worm 10 moves the jaw 9 so that the jaws 8, 9 can be moved past the corners of the nut or the screw head and cause the jaws to get a new grip on the work which can be tightened up or loosened continuously. In the embodiment shown, the invention is applied to a wrench in which the adjustable jaw 9 is movable in a direction forming an angle to the longitudinal direction of the handle lever 2, but it is evident that the invention may also be applied to a wrench the adjustable jaw of which is movable substantially parallel with the longitudinal direction of the handle 2. Thus, the invention is not restricted to wrenches in which the distance between the jaws is adjustable substantially in the transverse direction of the handle 2. Also other details of the wrench may be varied without departing from the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An adjustable wrench with a handle lever carrying a head with a stationary jaw and an adjustable jaw, the distance between the jaws being adjustable by a

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rotary worm or screw journaled in the head and slidable by means of the handle lever which is pivoted to the head and spring-actuated, characterised therein that the worm is journaled on a shaft slidable in the head and, by a cog or tooth connection, standing in permanent articulated connection with the handle lever for imparting sliding movement of the shaft and worm in either adjusting direction of the adjustable jaw by actuation of the handle lever.

2. A wrench as claimed in Claim 1, characterised therein that the worm shaft is provided with a recess in which a corresponding tooth on one end of the handle lever engages so that in the swinging of the handle lever in one direction the adjustable jaw will be moved from the stationary jaw sufficient to pass the corners of the nut or screw head and, when swung in opposite direction, the jaws will again firmly grip the nut or screw head.

3. A wrench as claimed in Claims 1 and 2, characterised therein that the pivot of the handle lever is placed so near the engaging point between the tooth on the handle lever and the recess for the tooth in the worm shaft that the arm of the lever forming the handle proper has a length sufficient to cause the jaws to maintain a firm grip on the nut or screw head when the handle lever is swung in the one direction.

4. A wrench as claimed in Claims 1 and 2, characterised therein that the worm shaft on the side of the worm opposite the recess is provided with a socket enclosing a coil spring exerting a constant braking

pressure on the worm and preventing self-rotation of the worm.

5. A wrench as claimed in Claims 1, 2 and 3, characterised therein that the end portion of the worm shaft provided with the recess, and also the socket on said shaft, have substantially rectangular or non-circular cross-section and that said portion of the worm shaft and socket engage with correspondingly shaped guideways in the head of the wrench so that they are slidable but not rotary in the head.

6. A wrench as claimed in Claim 1, characterised therein that one end portion of a leaf spring actuating the handle lever is clamped between two pins, one of which is threaded and adapted to be removed from the head if the plate spring is to be replaced.

7. A wrench as claimed in Claims 1 and 2, characterised therein that the wrench head, which has a more or less oblong shape, adjacent to the handle lever has an extension forming a finger grip adapted to facilitate actuation by operator's hand on the handle lever in the one or the other direction.

8. An adjustable wrench constructed and operating substantially as herein described with reference to the accompanying drawing.

Dated the 4th day of June, 1947.

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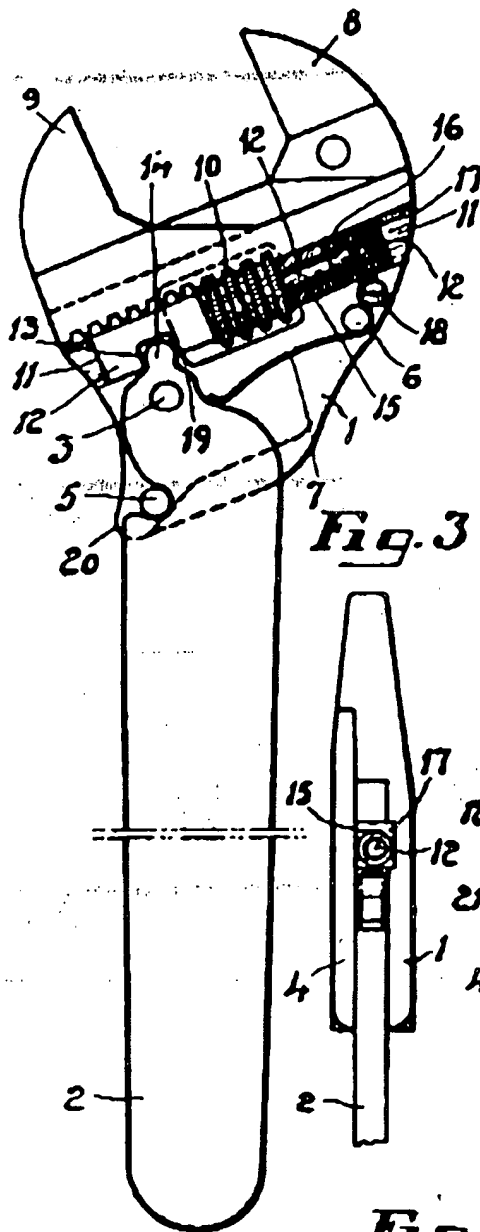
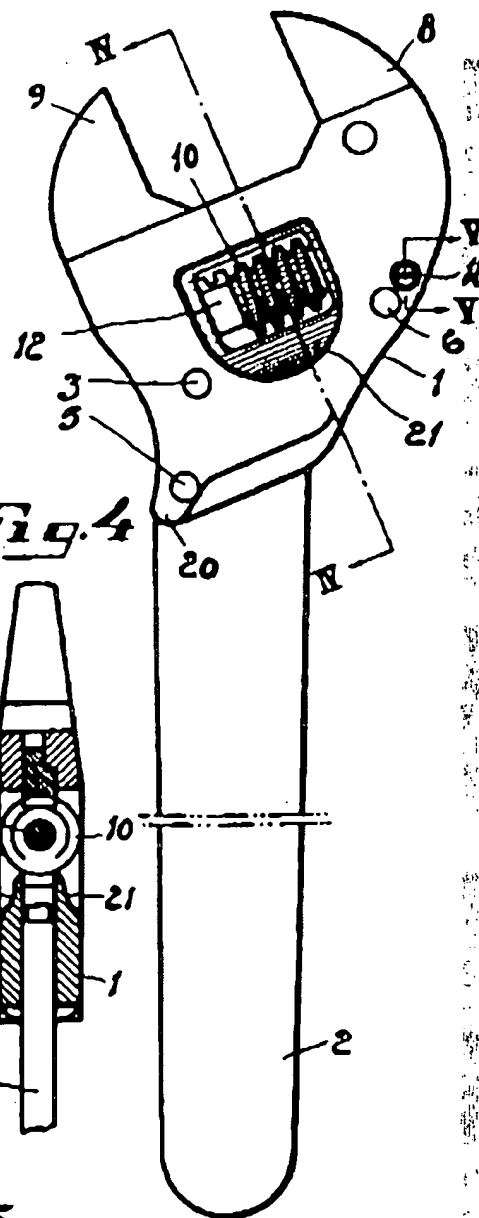
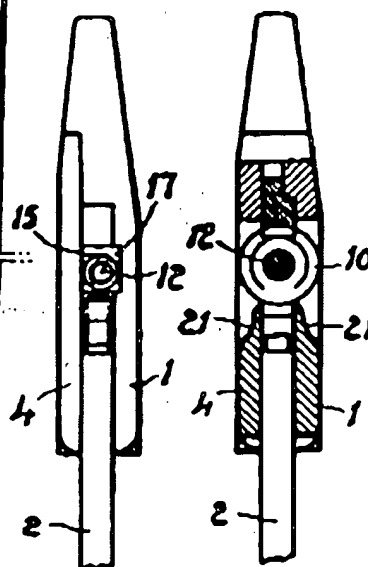
Agents for the Applicant.

Leamington Spa: Printed for His Majesty's Stationery Office by the Courier Press.—1949.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which  
copies, price 2s. 0d. each (Inland) 2s. 1d. (abroad) may be obtained.

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1 SHEET

*Fig. 1**Fig. 2**Fig. 3 Fig. 4**Fig. 5*

[This Drawing is a reproduction of the Original on a reduced scale.]

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